



Faculty of Design

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Building a Systemic Designer's Library: Borrowing from multiple disciplines to develop systemic design mental models

Luna, Beatrice

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hello!

Designing to positively impact systems can at (a lot of) times feel overwhelming - like navigating unfamiliar territory, with very real but often unknown consequences.



**Can systemic design look to
other disciplines for helpful
metaphors and mental models
to decrease overwhelm?**



How metaphors are being used in systemic design

The magic of metaphors

- Make the “unfamiliar familiar” (Gick, 1986)
- Makes engaging with systems easier by turning the complex and intangible into digestible, concrete, actionable concepts (Lockton, 2021)

Making sense of systems and reframing issues

- **Finding leverage points** by mapping systems to analogues (Lockton, 2021)
- Using “**maps**” and “**ice bergs**” to understand problem spaces in public and social innovation (van der Bijl-Brouwer, 2019)
- Seeing urban housing projects as a “**disease that must be cured**” – problem frames were oriented towards “curing” (Saffer, 2005; Schon, 1979)

Communicating perspectives, experiences, ideas

- Reveals people’s **understanding of systems from their POV and underlying assumptions** (Lockton, 2021; Dudani, 2021)
- Surfaces **experiential knowledge** of living within a system (Dudani, 2021)
- Allows **stories to be made tangible** (Dudani, 2021)
- Conveying (abstract) **solution ideas** to others (Saffer, 2005)
- Create **legitimacy for strategic changes** within organisations through increasing understanding (Cornelissen et al, 2011)

Generating ideas

- Metaphors as a **brainstorming technique** (Saffer, 2005), like using metaphor cards prompting novel ideas (Lockton et al, 2019)
- Metaphors as **inspiration for solutions** - e.g. Japanese bullet trains copying Kingfisher beaks (The Biomimicry Institute, 2021)

Why blend design with other disciplines?



Fresh eyes

Placing problem situations in an analogous situation in another discipline can inspire new approaches to the issues at hand (Dorst, 2018)



Seeing from multiple angles

Drawing from diverse ways of knowing (van der Bijl-Brouwer et al, 2019) to arrive at policy recommendations – e.g. severe droughts in Mekong River Basin



Sharpen our own practice

For example, drawing from law's practice around archiving and learning from precedents to learn from collective wisdom (Dorst, 2018)

Borrowing from physics, medicine, and economics

Systemic design principles

Boundary framing

Selecting boundaries of the problem situation in which we design (Jones, 2014)

Idealization and purpose

Identifying an ideal state/desirable outcome; agreeing on purposes (Jones, 2014)

Continuous adaptation and evolutionary design practice

Expecting divergence from expected paths across time, prompting the need for “multiple steps to shift the problem situation in the desired direction” (Jones, 2014; van der Bijl-Brouwer & Malcolm, 2020)

Disciplines & concepts

Physics

“Work done” is analogous to “progress” and is determined by how “movable” an object is

Medicine

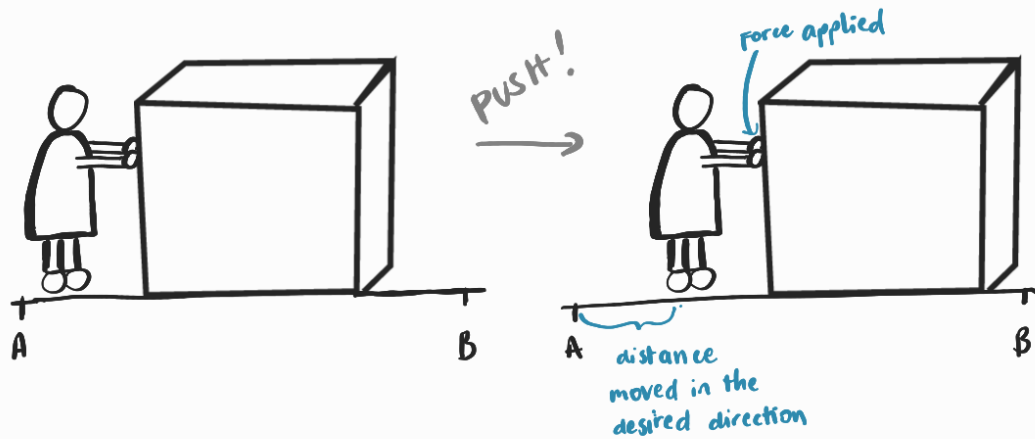
The human body as a system; different medicine types suitable for different objectives

Economics

Marginal analysis, which tackles the question, “is this additional effort worth the cost it entails?”

Systemic design and physics

The physics concepts of mass and work done give us a framework to **scope the problem situation** we wish to focus on – balancing depth of impact (“mass”) and realistic progress (“work done”)



WORK = force applied x distance moved in the desired direction

Work

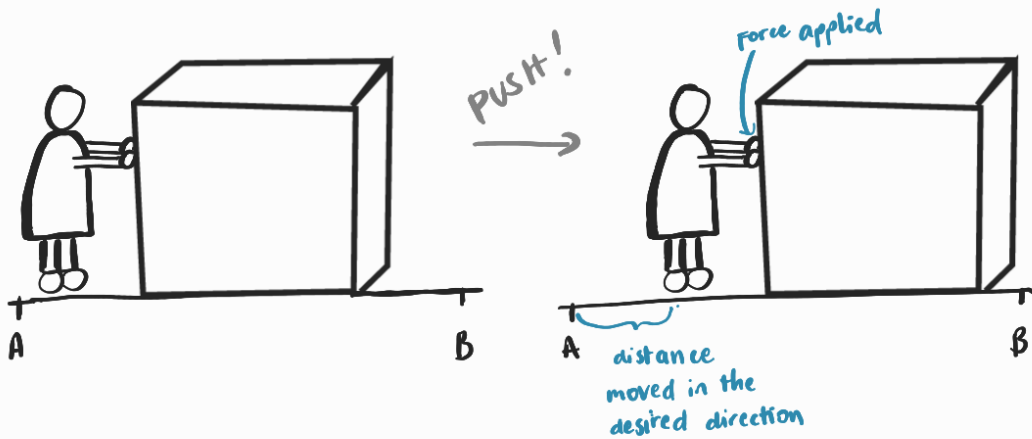
“How much did the object **move in the desired direction** as a result of the force applied?”

To get more work done

- Apply more force
- Make sure you’re moving in the right direction
- Make the object movable – **adjust mass**

Systemic design and physics

The physics concepts of mass and work done give us a framework to **scope the problem situation** we wish to focus on – balancing depth of impact (“mass”) and realistic progress (“work done”)



WORK = force applied x distance moved in the desired direction

Progress

“How much did the problem **situation shift in the desired direction** as a result of our effort?”

To make more progress:

- Apply more effort/resources
- Make sure you’re moving in the right direction
- Make the object movable – **adjust the scope**

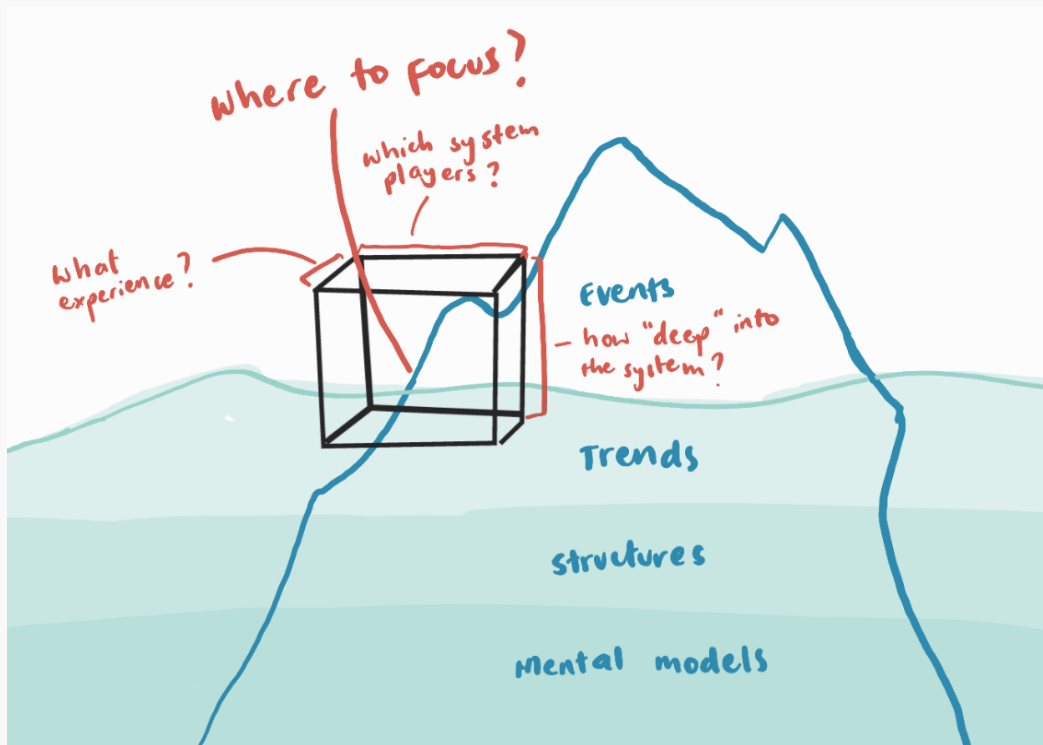
Systemic design and physics

Adjusting an object's mass

- **Dimension 1**
“Which system players do we want to focus on?”
- **Dimension 2**
“Which observable experiences/events do we wish to shift?”
- **Dimension 3**
“How deep into the ‘iceberg’ can we go?”

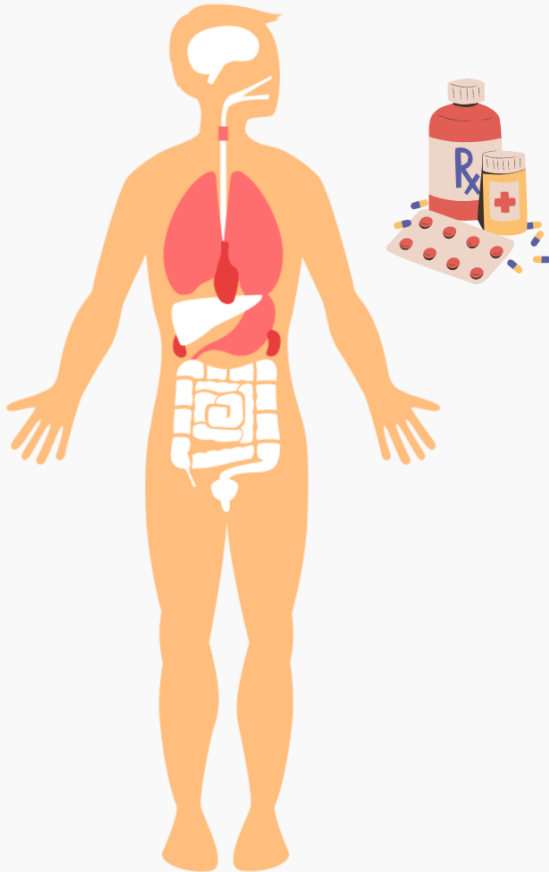
Example: people lacking any form of formal identification, hindering access to public services. This begins at inaccessible birth registration processes.

- **Dimension 1**
Target communities, city government
- **Dimension 2**
The ability to get formal documentation without a birth certificate
- **Dimension 3**
For a grassroots org – probably at the “trends” level



Systemic design and medicine

Medicine gives us a framework to define what “**ideal**” looks like, identify the **subsystems** that contribute to this, and **frame questions /generate ideas** aligned to our objectives






Human bodies as systems

If the ideal state is a “healthy body,” each subsystem (e.g. respiratory, nervous, digestive, etc) must function well and work together to achieve that

Medicines as objective-specific interventions

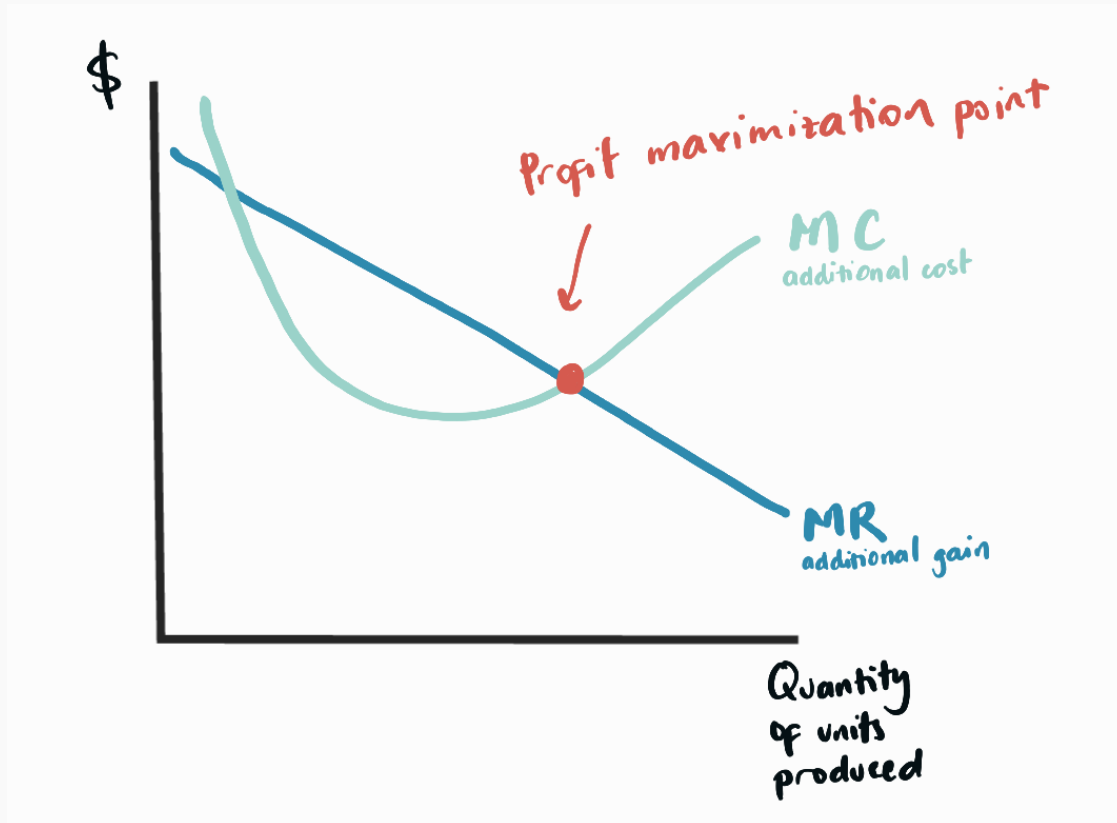
If one or a few subsystems are malfunctioning, this can be addressed through various types of medicines

Systemic design and medicine

Objective	Medicine type	Sample framing questions	Sample analogous solutions
Coping with issues, reducing harm and managing fatal risks	 Maintenance medication (e.g. diabetes medication)	What might be done to prevent the situation from worsening?	Use less challenging (but less legitimate) documents to cope – limited access to services
Quick relief of short-term symptoms; restore system's ability to function or work around an issue temporarily	 Acute medication (e.g. headache medication) Prophylactic antibiotics (i.e. used before surgery)	How might we offer quick relief, so we can make space for finding longer-term and preventive solutions?	Birth registration events to expedite registration Giving temporary IDs for specific and temporary purposes
Long-term prevention; dissolving a systemic issue	 Vaccines	How might we vaccinate against potential issues x, y, z? Or how do we prevent this from reoccurring? How can we change mental models sitting at the root of systemic issues?	Permanent, viable, and accessible pathways to procuring official identity documents when birth certificates are absent

Systemic design and economics

Economics gives us a framework to **navigate incremental but continuous change** – weighing the benefits of “taking steps forward” against the costs of adapting to evolving constraints and needs



Profit maximization

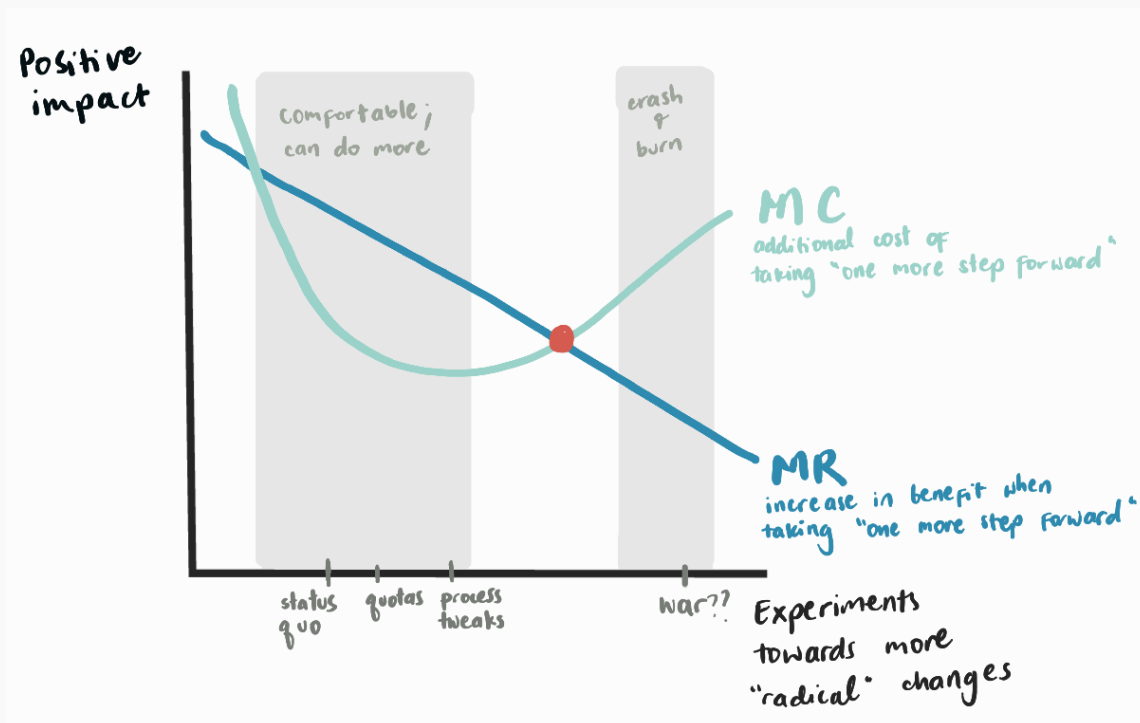
“Should we produce one more additional unit, or stay in status quo – considering the **additional benefit** (marginal revenue) and **cost** (marginal cost) this entails?”

Profit maximization point

- Keep going until you reach the point where **marginal benefit = marginal cost**
- Anything to the left = missed opportunities (which also have opportunity costs)
- Going too far to the right = draining resources

Systemic design and economics

Economics gives us a framework to **navigate incremental but continuous change** – weighing the benefits of “taking steps forward” against the costs of adapting to evolving constraints and needs



Impact maximization

“Should we keep pushing the envelope, or stay in status quo – considering the **additional benefit** (marginal revenue) and **cost** (marginal cost) this entails?”

Impact maximization point?

- **Anything to the left = opportunity costs** (e.g. unemployment that could have been avoided if only people had pathways to getting legitimate identity documents)
- **Going too far to the right = too radical too fast; chaos, unsustainable** (what if we get rid of requiring identity documents altogether?)

Borrowing concepts works like shopping



Because the analogues are not immediately obvious, this process involves trial and error, and looking for disciplines where the relationships we see in ours are parallel to relationships within another disciplines (Gick and Holyoak, 1980)

Choosing a discipline to borrow from

is like finding a “store” with the highest likelihood of finding what you need

Tip 1: Observe the language being used – what other disciplines use a similar language?

*“critical mass,” “movement,” “friction,” “tension” – physics;
“adaptation,” “evolution,” “migration,” “growth” – biology;
“triage,” “emergency response,” “protocols” – emergency medicine;
“asking questions,” “getting to the root,” “interviewing,” “relevance” - journalism*

Tip 2: Expand what you have surface knowledge about so you have more disciplines to choose from (like window shopping)

*Exploring without expecting to become an expert
Can also draw from “lived experiences” - but this is more difficult to explore*

Borrowing concepts works like shopping



Because the analogues are not immediately obvious, this process involves trial and error, and looking for disciplines where the relationships we see in ours are parallel to relationships within another disciplines (Gick and Holyoak, 1980)

Choosing concepts to use

is like going through a shortlist of items that likely fit the bill

Tip 1: Anchor on the words being used and explore the attached concepts to narrow down your search

How does physics define “movement”? What does it look like?

How does it work?

What principles govern this concept? Is there an equation/model?

Does it feel comfortable and easy to use?

Tip 2: Try them on until you feel the fit

Try mapping the systemic design activity you’re doing to different concepts

Where does the metaphor shine? Where does it break? (doesn’t have to be perfect, as long as the essence is captured)

Does it help you and everyone you’re working with navigate the territory easier?

Tip 3: Not working out? Try a different “store” (discipline) 😊

Leaving you with **two questions...**

What could we learn from other disciplines that could help strengthen our practice? What opportunities and challenges could situating design processes in disciplines other than design – especially given the complexity we are grappling with – bring?

How might we leverage collective wisdom from various disciplines and lived experiences to understand complex, systemic issues, design interventions to begin dissolving them, and implement these sustainably?

... and one ask*

Thoughts? Suggestions? Let's connect! 😊



in/bcvluna



beatricevluna@gmail.com

**pun intended*